

HRS DOCUMENTATION RECORD--REVIEW COVER SHEET

Name of Site: Cidra Ground Water Contamination

Date Prepared: February 2003

Contact Persons

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Pathways, Components, or Threats Not Scored

The Surface Water, Soil Exposure, and Air Pathways were not scored because the listing decision is not significantly affected by those pathways. The site score is sufficient to list the site on the Ground Water Pathway score.

HRS DOCUMENTATION RECORD

Name of Site: Cidra Ground Water Contamination

CERCLIS ID No.: PRN000204538

EPA Region: 2

Date Prepared: February 2003

Street Address of Site:

Cidra Ground Water Plume: Road 171 (Avenida Muñoz Rivera)

County and State: Cidra, Puerto Rico 00739

General Location in the State: central eastern Puerto Rico

Topographic Map: Comerío, PR

Latitude: 18° 10' 31.0" North

Longitude: 66° 09' 43.0" West

[Ref. 3; Ref. 4].

Scores

Ground Water Pathway	100
Surface Water Pathway	Not Scored
Soil Exposure Pathway	Not Scored
Air Pathway	Not Scored

HRS SITE SCORE 50

WORKSHEET FOR COMPUTING HRS SITE SCORE

	<u>S</u>	<u>S²</u>
1. Ground Water Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	<u>100</u>	<u>10,000</u>
2a. Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	<u>Not Scored</u>	
2b. Ground Water to Surface Water Migration Component (from Table 4-25, line 28)	<u>Not Scored</u>	
2c. Surface Water Migration Pathway Score (S_{sw}) Enter the larger of lines 2a and 2b as the pathway score.	<u>Not Scored</u>	
3. Soil Exposure Pathway Score (S_s) (from Table 5-1, line 22)	<u>Not Scored</u>	
4. Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	<u>Not Scored</u>	
5. Total of $S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$	<u>10,000</u>	
6. HRS Site Score Divide the value on line 5 by 4 and take the square root	<u>50.00</u>	

**GROUND WATER MIGRATION PATHWAY SCORESHEET
CIDRA GROUND WATER CONTAMINATION SITE
GROUND WATER CONTAMINATION**

GROUND WATER MIGRATION PATHWAY Factor Categories & Factors	MAXIMUM VALUE	VALUE ASSIGNED
Likelihood of Release to an Aquifer Aquifer: Pre-Robles Volcanic Rock		
1. Observed Release	550	550
2. Potential to Release		
2a. Containment	10	
2b. Net Precipitation	10	
2c. Depth to Aquifer	5	
2d. Travel Time	35	
2e. Potential to Release [lines 2a (2b+2c+2d)]	500	
3. Likelihood of Release	550	550
Waste Characteristics		
4. Toxicity/Mobility	*	100
5. Hazardous Waste Quantity	*	100
6. Waste Characteristics	100	10
Targets		
7. Nearest Well	50	50
8. Population		
8a. Level I Concentrations	**	1,120
8b. Level II Concentrations	**	383
8c. Potential Contamination	**	204
8d. Population (lines 8a+8b+8c)	**	1,707
9. Resources	5	5
10. Wellhead Protection Area	20	20
11. Targets (lines 7+8d+9+10)	**	1,767
12. Targets (including overlaying aquifers)	**	1,767
13. Aquifer Score (lines 3x6x12 divided by 82,500)	100	100
GROUND WATER MIGRATION PATHWAY SCORE (Sgw)	100	100

* Maximum value applies to waste characteristics category.

** Maximum value not applicable.

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SOURCE DESCRIPTION

2.2 SOURCE CHARACTERIZATION

Number of the source: 1

Name and description of the source: Cidra Ground Water Plume - Cidra, Puerto Rico

Source Type: Other

Source 1 is considered a contaminated ground water plume of unknown volume without an identified source. Puerto Rico Department of Health (PRDOH) ordered the following four public supply wells in Cidra to be closed due to contamination by tetrachloroethylene (PCE): Cidra Well 4 (Calle Padilla Final) in March 1996; Cidra Well 8 (Frente Cementerio) in October 1996; Cidra Well 3 (Planta Alcantarillado) in February 1999; and Cidra Well 6 (Calle Baldorioty) in August 2000 [Ref. 5, p. 1; Ref. 6, pp. 2, 3; Ref. 7, pp. 2, 3; Ref. 26, p. 2]. Other chlorinated volatile organic compounds (VOCs), including 1,1-dichloroethylene (1,1-DCE) and trichloroethylene (TCE), were also detected in the wells before they were closed [Ref. 5, p. 2; Ref. 6, pp. 5, 8; Ref. 7, p. 2; Ref. 8, pp. 2, 3, 4, 6 through 10, 14, 17].

EPA Region 2 undertook an ESI in June 2002 and January/February 2003 to determine the source or sources of this contamination [Ref. 109]. In June 2002, the EPA Region 2 SAT collected ground water samples from the closed wells, 20 other active and inactive wells in the Cidra area, as well as background samples [Ref. 9, pp. 2 through 60; Ref. 10, pp. 3 through 10; Ref. 11, pp. 52, 53, 88, 89, 143, 144, 146, 147]. PCE was confirmed in the closed wells as it was detected at concentrations ranging from 0.64 to 12 micrograms per liter (ug/L), and was also detected in two nearby industrial/potable supply wells (GW20, GW21, GW22) at concentrations ranging from 3.5 to 4.1 ug/L [Ref. 10, pp. 7, 9; Ref. 11, pp. 73, 74, 76, 77, 79, 80, 131, 132, 134, 135, 137, 138, 140, 141, 152, 153]. Related chlorinated solvents, including 1,1-DCE; 1,1-dichloroethane (1,1-DCA); cis-1,2-dichloroethylene (cis-1,2-DCE); carbon tetrachloride; and TCE, were also detected in ground water samples [Ref. 11, pp. 73, 74, 76, 77, 79, 80, 131, 132, 134, 135, 137, 138, 140, 141, 152, 153].

In January and February 2003, Region 2 SAT field screened and collected soil samples from 12 industrial sites in Cidra as part of an investigation of potential sources of contamination to the ground water plume; however, this data does not conclusively substantiate attribution of the ground water contamination to any source. The data collected by Region 2 SAT does point more clearly to five sources investigated (discussed in other possible sources section); however, there is not one specific potential source identified which displayed the same suite of contamination as the closed public supply wells (Cidra Well 3, Cidra Well 4, and Cidra Well 6). The chlorinated solvents found in the closed wells are not naturally occurring, and the non-detect concentrations in the background wells show that they are not ubiquitous in the area [Ref. 11, pp. 52, 53, 88, 89, 143, 144, 146, 147].

Location of the source, with reference to a map of the site:

The Cidra Ground Water Plume is identified by contamination found in four closed public supply wells and two industrial supply wells located in the southern vicinity of the town of Cidra. These six wells are clearly contained in the plume area and for the purpose of this report represent a minimum of the plume extent. Cidra is located in the central eastern portion of Puerto Rico [Ref. 1, p. 51600; Ref. 26, p. 1; Ref. 34, p. 3].

Containment

Release to ground water:

Based on evidence of both hazardous substance migration (contamination detected in ground water samples collected from four closed public supply wells and two nearby industrial wells) and due to the fact that there is nothing to prevent the plume from migrating further, a containment factor of 10 is assigned [Ref. 1, p. 51596; Ref. 11, pp. 52, 53, 58, 59, 64, 65, 73 through 80, 85, 86, 88, 89, 131 through 147, 152, 153]. No evidence of a slurry

wall, liner, maintained and engineered cover, or other containment features were present during the site reconnaissance or subsequent sampling of the closed wells [Ref. 9, pp. 15, 16, 25 through 35, 61, 62].

2.4.1 Hazardous Substances

EPA Expanded Site Inspection
Ground Water Samples: June 2002

<u>Hazardous Substance</u>	<u>Evidence</u>	<u>Reference(s)</u>
PCE	1047-GW03 (10 ug/L)	11, pp. 131, 132
	1047-GW05 (0.64 ug/L)	11, pp. 134, 135
	1047-GW06 (0.72 ug/L)	11, pp. 137, 138
	1047-GW20 (3.5 ug/L)	11, pp. 73, 74
	1047-GW21 (3.6 ug/L)	11, pp. 76, 77
	1047-GW22 (4.1 ug/L)	11, pp. 79, 80
	1047-GW09 (ND)*	11, pp. 52, 53
	1047-GW10 (ND)*	11, pp. 143, 144
	1047-GW11 (ND)*	11, pp. 146, 147
1047-GW27 (ND)*	11, pp. 88, 89	
1,1 DCE	1047-GW20 (8.4 J ug/L)	11, pp. 73, 74
	1047-GW21 (7.6 J ug/L)	11, pp. 76, 77
	1047-GW22 (12 J ug/L)	11, pp. 79, 80
	1047-GW09 (ND)*	11, pp. 52, 53
	1047-GW10 (ND)*	11, pp. 143, 144
	1047-GW11 (ND)*	11, pp. 146, 147
	1047-GW27 (ND)*	11, pp. 88, 89
1,1 DCA	1047-GW20 (0.51 ug/L)	11, pp. 73, 74
	1047-GW21 (0.62 ug/L)	11, pp. 76, 77
	1047-GW22 (0.70 ug/L)	11, pp. 79, 80
	1047-GW09 (ND)*	11, pp. 52, 53
	1047-GW10 (ND)*	11, pp. 143, 144
	1047-GW11 (ND)*	11, pp. 146, 147
1047-GW27 (ND)*	11, pp. 88, 89	
cis-1,2-DCE	1047-GW03 (1.0 ug/L)	11, pp. 131, 132
	1047-GW09 (ND)*	11, pp. 52, 53
	1047-GW10 (ND)*	11, pp. 143, 144
	1047-GW11 (ND)*	11, pp. 146, 147
	1047-GW27 (ND)*	11, pp. 88, 89

ug/L - micrograms per liter
 J - estimated value
 ND - contaminant not detected
 * - background concentration

2.4.2 Hazardous Waste Quantity

2.4.2.1.1 Hazardous Constituent Quantity

The information available is not sufficient to evaluate Tier A source hazardous waste quantity; therefore, hazardous constituent quantity is not scored (NS).

Hazardous Constituent Quantity © (A) Value: NS

2.4.2.1.2 Hazardous Wastestream Quantity

The information available is not sufficient to evaluate Tier B source hazardous waste quantity; therefore, hazardous wastestream quantity is not scored.

Hazardous Wastestream Quantity (W) Value: NS

2.4.2.1.3 Volume

Because there are six wells with samples showing contamination in the ground water but the volume of the contaminated area has not been determined, the volume of the ground water contamination is considered to be greater than 0 cubic yards but unknown [Ref. 27, p. 1; Ref. 29, p. 1]. Therefore, volume (V) is assigned a value of >0 but unknown [Ref. 1, p. 51591, Section 2.4.2.1.3].

Dimension of source (yd³): >0

Volume (V) Assigned Value: >0

2.4.2.1.4 Area

Since the volume of the waste source can be determined, a value of 0 is given for area measurement [Ref. 1, p. 51591].

Area of source (ft²): N/A

Area (A) Assigned Value: 0

2.4.2.1.5 Source Hazardous Waste Quantity Value

The source hazardous waste quantity value for Source 1 is >0 but unknown for Tier C - Volume [Ref. 1, p. 51591].

Source Hazardous Waste Quantity Value: >0

SITE SUMMARY OF SOURCE DESCRIPTIONS

Source Number	Source Hazardous Waste Quantity Value	Ground Water	Containment		
			Surface Water	Gas	Air Particulate
1	>0	10	NS	NS	NS

NS = Not Scored

Other Possible Sources

In January and February 2003, Region 2 SAT investigated 12 industrial sites in Cidra either to identify potential sources of contamination to the ground water plume or to delineate the contamination [Ref. 9, pp. 63 through 109]. Eleven of the sites are listed in EPA's Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Hazardous Waste Sites database, and one site is listed in the Archived Sites database [Ref. 16, pp. 1 through 24]. Region 2 SAT used direct-push technology to complete soil borings at the 12 industrial sites plus two background sites and retrieve soil cores (and in one case, a ground water sample) from each borehole at 5-foot intervals. The soil cores and ground water sample were then screened for VOCs with the HAPSITE® Headspace Sampling System [Ref. 9, pp. 63 through 109; Ref. 18, all pages; Ref. 19, all pages; Ref. 20, p. 1]. Region 2 SAT selected samples for VOC analysis through CLP [Ref. 10 pp. 63 through 109; Ref. 17, all pages; Ref. 18, all pages; Ref. 19 p. 1]. As a result of this effort five sites remain possible sources. If no contamination was found at the site or the site was determined to be outside the boundary of the plume it will be discussed in the Attribution section of this report. The sites which remain possible sources of the Cidra Ground Water Plume and corresponding results of the subsurface investigation are listed below:

1. International Dry Cleaners (INT) CERCLIS No. PRN000204340

The INT site is located on Muñoz Rivera Avenue in the village of Cidra, less than 0.1 mile northeast of Cidra Well 4 [Ref. 9, p. 61; Ref. 26, p. 4; Ref. 67, p. 15]. Dry cleaning has been performed at the facility since approximately 1994. The current operator bought the business in 1996, and leases the building from a private property owner [Ref. 9, p. 61]. INT uses PCE in diesel-operated machinery, and captures the solvent for reuse. Filters and spent solvent are periodically removed by a transporter; however, the facility does not operate under any permits. INT does not discharge any waste to the sewer system [Ref. 34, p. 10].

INT was not listed in the February 2000 or current Puerto Rico directory of manufacturers [Ref. 36, p. 23; Ref. 37, pp. 2 through 6]. The company is not included in EPA's RCRA facility list for Cidra [Ref. 47, p. 13], nor was it included in the lists of Cidra companies that submitted Tier 1 and 2 Reports to EPA in 1993, 1997, or 1998 [Ref. 31, p. 3; Ref. 30, p. 6; Ref. 55, pp. 7, 8]. INT does not have a UIC permit, and was not identified as a significant violator by the PRASA Pretreatment Program from 1990 through 1998 [Ref. 33, p. 1; Ref. 50, p. 3].

The field-screening results indicated the presence of PCE, TCE, and trans-1,2-DCE in soils collected from the INT site. The samples where solvents were detected came from depths of 2 to 7 feet, with the highest reading in a 4-foot depth sample [Ref. 18, pp. 2, 22, 26, 33; Ref. 21, pp. 2 through 16]. One surface and four subsurface soil samples were collected from INT site as part of the ESI [Ref. 9, pp. 94-97; Ref. 20, p. 15]. The CLP analytical results confirm that PCE and related substances are present in soil at the INT site [Ref. 21, pp. 345 through 347 and 351 through 362]. PCE at 11,000 ug/kg; TCE at 2,800 ug/kg; and cis-1,2-DCE at 5,100ug/kg were detected in the 4-foot sample. The same compounds were detected in the 7-foot sample at lower concentrations, while just cis-1,2-DCE at 6,700 ug/kg was detected in the 2-foot sample [Ref. 20, p. 15; Ref. 21, pp. 345, 346, 354, 355, 360].

The levels of PCE, TCE, and cis-1,2-DCE exceed EPA's generic migration-to-ground water SSLs, and the maximum PCE concentration equals the generic inhalation SSL [Ref. 22, pp. 12, 14]. This possible source is close to the most

contaminated public supply wells [Ref. 26, p. 4]. However, contamination was not found in sampling below this depth at this location.

2. Zenith Laboratories Caribe, Inc. (ZEN) CERCLIS No. PRD987377702

The ZEN site is located on A Street in Cidra Industrial Park, about 0.2 mile east of Cidra Well 8 [Ref. 16, p. 21; Ref. 26, p. 4; Ref. 34, pp. 4, 86]. There are two buildings on site that support manufacturing. Building C-2 was occupied by Omark Antilles, Inc., a manufacturer of electroplated chainsaws, from 1978 until 1985 and by ZEN (a.k.a. IVAX Pharmaceuticals), a pharmaceuticals manufacturer, since 1985. ZEN/IVAX Pharmaceuticals (IVAX) has occupied building C-1 since 1983 [Ref. 104, pp. 1, 2]. ZEN/IVAX completed a 30,000-square-foot expansion and transferred the production of several products to its Cidra facilities in 1999 [Ref. 105, p. 2].

Omark Antilles, Inc. (Omark) notified EPA that it was a generator of hazardous waste in March 1981 [Ref. 104, pp. 169, 170]. The company, which was classified as a RCRA-LQG, used and generated as waste 1,1,1-TCA and other hazardous chemicals, including chromium hydroxide. Omark generated approximately 1,400 pounds of chromium sludge annually [Ref. 104, p. 2]. EQB performed a RCRA inspection of the Omark facility in May 1984 and found that the site was not in full compliance with RCRA regulations [Ref. 104, pp. 190 through 193]. EQB inspected the facility again in May 1985 and found Omark to be in compliance [Ref. 104, pp. 230 through 241].

ZEN/IVAX uses methylene chloride and methanol as solvents in its manufacturing processes, and isopropanol to clean the machinery [Ref. 104, p. 2]. The company is classified as a Conditionally Exempt Small Quantity Generator (CESQG) under RCRA and maintains a Hazardous Waste Container Storage Area (HWCSA) on site [Ref. 104, p. 3]. EQB performed RCRA inspections of ZEN in October 1995, October 1997, and November 1998, and found the facility to be in compliance each time [Ref. 104, pp. 98 through 107; Ref. 106, pp. 1 through 4]. During Pre-CERCLA inspections in February 1999 and May 2000, EQB noted the presence of 55-gallon drums containing acetonitrile, chloroform, and solvent mixture (methanol, hexane) in the HWCSA and observed stressed vegetation near it [Ref. 104, p. 3; Ref. 107, pp. 1 through 5].

There is an old wastewater treatment plant on this site. PRIDCO personnel inspected the facility in February 2000, and recommended closure of the wastewater treatment plant since it was no longer in use [Ref. 108, pp. 1, 2].

Omark was listed in the April 1983 Puerto Rico directory of manufacturers [Ref. 42, p. 26]. ZEN was listed in the April 1992 and February 2000 directories, and IVAX is listed in the current directory [Ref. 34, p. 12; Ref. 37, p. 5; Ref. 47, p. 12]. Omark (EPA Facility ID PRD091007369) and IVAX (EPA Facility ID PRD987377702) are both listed in EPA's RCRA facility list for Cidra [Ref. 47, pp. 13, 16]. ZEN submitted Tier 1 and 2 Reports to EPA in 1993, 1997, 1998, and 1999. Chloroform, methanol, and isopropyl alcohol were reported as wastes generated in 1997 [Ref. 31, p. 3; Ref. 40, p. 6; Ref. 55, p. 8; Ref. 104, pp. 109 through 117]. ZEN discharged to the sewer system under PRASA permit GDA-90-505-013. The facility was identified as a significant violator by the PRASA Pretreatment Program from 1991 through 1997 [Ref. 33, pp. 1, 5, 12, 16, 22, 27, 32].

Ground water samples were collected as part of this ESI, in June 2002 and detections of 1,1-DCE ranging from 7.6 ug/L to 12 ug/L and 1,1-DCA ranging from 0.51 to 0.70 were reported from process wells located at the IVAX facility [Ref. 11, pp. 73 through 80]. One surface and two subsurface soil samples were collected from two soil borings at this site also as part of the ESI [Ref. 9, pp. 80 through 83, 76; Ref. 21, p. 15]. 1,1-DCE was detected at 20 ug/Kg (above the generic SSL) in a soil sample collected from this site at a 62-foot depth [Ref. 9, p. 85; Ref. 21, pp. 87 through 95 and 459 through 464]. However there were no concentrations detected above background in any samples collected from the surficial or intermediate depths [Ref. 9, p. 85; Ref. 21, pp. 87 through 95 and 495 through 464].

3. Cidra Convention Center (CCC) CERCLIS No. PRN000204333

This site located on A Street in Cidra Industrial Park, about 0.1 mile east of Cidra Well 8, is owned by Ramallo Bros. Printing, Inc., a former operator at the site [Ref. 16, p. 5; Ref. 26, p. 4; Ref. 34, pp. 7, 86; Ref. 53, p. 1; Ref. 54, pp. 1, 2]. During inspections of the neighboring Porsche and Shelfoam facilities in January 1988 and May 1992, respectively, Ramallo & Escribano, Inc. - Linear Packaging Division was observed to be operating at the CCC site [Ref. 40, pp. 1, 2; Ref. 73, pp. 6, 13]. Ramallo allegedly had numerous environmental issues associated with the site, including discolored wastewater flowing through drainage systems near the facility and into the street. Another

former occupant of the building was Sierra Instruments, a label maker [Ref. 43, p. 7]. The last occupant of the building, CCC, used the building for weddings, dances, banquets, and conferences for about one year in 1996 [Ref. 53, p. 1].

None of the former occupants of the CCC site was listed in the April 1983 or April 1992 Puerto Rico directories of manufacturers [Ref. 42, pp. 32, 33; Ref. 47, p. 26]. The former occupants are not included in EPA's RCRA facility list for Cidra [Ref. 38, pp. 4, 5, 18, 19, 20], nor were they included in the list of Cidra companies that submitted Tier 1 and 2 Reports to EPA in 1993 [Ref. 55, pp. 7, 8]. The companies never obtained UIC permits, and were not identified as significant violators by the PRASA Pretreatment Program from 1990 through 1998 [Ref. 33, p. 1; Ref. 50, p. 3].

One surface and three subsurface soil samples were collected from two soil borings at the CCC site as part of the ESI [Ref. 9 pp. 86 through 89; Ref. 20, p. 16]. Data indicates the presence of PCE at estimated values of 2 and 5 ppb in samples collected from each soil boring advanced at this facility [Ref. 21, pp. 420 through 431].

4. Caribbean Manufacturing Co. (CMC) CERCLIS No. PRN000204331

The building at this site, Lot 3 on Principal Street (a.k.a. El Jibaro Avenue) in El Jibaro Industrial Park, is located about 0.6 mile north-northeast of Cidra Well 6 [Ref. 26, p. 4; Ref. 29, pp. 3, 7]. CMC, a manufacturer of doors and windows, occupied all or part of the building from June 1994 through December 1998 [Ref. 29, pp. 3, 5, 7; Ref. 30, p. 10]. CMC was not classified as a hazardous waste generator [Ref. 38, p. 5], nor was it included in the lists of Cidra companies that submitted Superfund Amendments and Reauthorization Act (SARA) SARA Title III Tier 1 and 2 Reports to EPA in 1997 or 1998 [Ref. 31, p. 3; Ref. 32, p. 6]. Additionally, it was not identified as a significant violator by the Puerto Rico Aqueduct and Sewer Authority (PRASA) Pretreatment Program in any of its operating years [Ref. 33, p. 1]. PRIDCO completed an environmental evaluation of the site in March 2000, and found that environmental conditions at the site posed no unacceptable risks. There were no solid wastes stored or abandoned at the site during the inspection [Ref. 29, pp. 1 through 5].

During an EPA Pre-CERCLIS investigation in June 2000, the site was found to be inactive [Ref. 34, p. 4]. Currently, Rexam Medical Packaging, a manufacturer of labels and inserts for pharmaceutical containers, uses the front half of the building as a warehouse for nonhazardous raw materials [Ref. 9, pp. 102, 103; Ref. 35, pp. 1, 2; Ref. 36, p. 11; Ref. 37, p. 6]. Pan de la Montaña Inc., a bakery company, occupies the rear portion of the building and is listed in the current Puerto Rico directory of plants operating in Cidra [Ref. 17, p. 168; Ref. 34, p. 5; Ref. 37, p. 5]. Rexam's manufacturing facility (also located in Cidra) is listed in the directory of plants; however, the warehouse site is not listed [Ref. 37, p. 6]. None of the current or former occupants of this site is included in EPA's Resource Conservation and Recovery Act (RCRA) facility list for Cidra [Ref. 38, pp. 2, 16, 17, 18, 19].

One surface and two subsurface soil samples were collected from two soil borings at the CMC site as part of the ESI [Ref. 20, p. 16]. Data indicates the presence of cis-1,2-DCE at an estimated value of 1 ppb [Ref. 9, pp. 102 through 104; Ref. 21, pp. 324 through 332].

5. CCL Label de Puerto Rico (CCL) CERCLIS No. PRN000204329

This PRIDCO-owned site is located on A Street in Cidra Industrial Park, less than 0.1 mile east of Cidra Well 8 [Ref. 16, p. 3; Ref. 26, p. 4; Ref. 34, pp. 4, 86; Ref. 39, p. 1]. Use of the building began in February 1967, either by Meyers & Son Mfg. Co., a manufacturer of work clothes, or Porsche Sportswear, Inc., a manufacturer of pre-washed jeans and jackets that occupied the building through November 1987 [Ref. 40, p. 1; Ref. 41, p. 1; Ref. 42, p. 10]. Porsche was listed in the April 1983 Puerto Rico directory of manufacturers [Ref. 42, p. 10]. In 1986, neighboring residents complained of hydrogen sulfide and chlorine odors emanating from Porsche, causing them to evacuate their homes in some cases. PRIDCO investigated in July 1986 and discovered an unauthorized underground sedimentation tank, the cleaning of which was responsible for the odors [Ref. 39, pp. 1, 2, 3]. PRIDCO suggested that Porsche relocate the plant to solve the problem and Porsche's parent company, Society Brand Industries, began to investigate relocation in January 1987 [Ref. 39, p. 4; Ref. 43, p. 2]. As of March 1988, PRIDCO would not cancel the lease due to environmental concerns [Ref. 44, p. 1].

Soil samples collected from the site in May 1989 did not exhibit characteristics of ignitability, corrosivity, or reactivity, and did not show the presence of toxicity metals [Ref. 45, pp. 4 through 10]. Based on the laboratory tests

and an environmental study of the site, PRIDCO reported in September 1989 that there were no known or suspected environmental problems or areas of concern at the site, and concluded that the site was not contaminated [Ref. 46, p. 1]. PRIDCO leased the building to Productos Mi Viejo, a manufacturer of frozen food, from January 1990 through May 1992 [Ref. 41, p. 1]. Productos Mi Viejo was not listed in the April 1992 Puerto Rico directory of manufacturers [Ref. 47, p. 26]. In July 1992, PRIDCO reported again that there were no known or suspected environmental problems or areas of concern at the site, and concluded that the site was not contaminated [Ref. 41, p. 2]. In November 1996, PRIDCO informed CCL that Productos Mi Viejo was the last tenant of the building [Ref. 41, p. 1].

CCL moved into the building in 1997 and has operated there since 1998 [Ref. 48, p. 1]. The company, which manufactures and prints labels for the pharmaceutical industry, submitted a Notification of Hazardous Waste Activity to EPA in March 1998 and is included in EPA's RCRA list for Cidra under facility ID PR0002426062 [Ref. 38, p. 2; Ref. 49, pp. 1, 2, 3]. CCL was listed in the February 2000 and current Puerto Rico directories of manufacturers [Ref. 36, p. 10; Ref. 37, p. 3]. The company generates liquid and solid waste containing ethyl acetate and methyl ethyl ketone. Records available at the CCL plant indicate that the company uses or has used a solvent mixture containing chlorinated solvents [Ref. 48, pp. 1, 2]. Based on a list obtained in April 2000, CCL does not have an Underground Injection Control (UIC) permit [Ref. 50, pp. 1, 3]. Puerto Rico Environmental Quality Board (EQB) inspections of the site in July 2001 and May 2002 found a number of administrative violations. In both cases, CCL subsequently addressed the violations to EQB's satisfaction [Ref. 48, pp. 36 through 40; Ref. 51, pp. 1 through 7; Ref. 52, p. 1].

Two surface and three subsurface (including a duplicate) soil samples were collected from two soil borings at the CCL site as part of the ESI [Ref. 9, pp. 78, 79; Ref. 20, p. 13]. There were no concentrations detected above background in any of the samples collected from this site which can be related to the contamination found in the wells outlined in Source 1, however based on the facilities' history of possible usage of chlorinated solvents the facility remains a possible source [Ref. 21, pp. 45 through 59].

3.0 GROUND WATER MIGRATION PATHWAY

3.0.1 General Considerations

The aquifer of concern in the Cidra area is in the saturated portion of the Pre-Robles Volcanic Sequence that underlies the region. Well data and logs obtained from PRASA, U.S. Geological Survey (USGS), and well owners/operators indicate that active and inactive wells in Cidra are finished in the rock formation, described in well logs mainly as blue, brown, or black volcanic rock [Ref. 23, pp. 1 through 46, 59, 64]. USGS (1971) describes the pre-Robles sequence as sparsely fossiliferous, massive rock including pyroxene andesite pyroclastic rock and lava. Closed and active wells throughout Cidra all are finished in the bedrock aquifer at total depths ranging from 110 to 705 feet below ground surface, with surface casing lengths ranging from 8 to 224 feet [Ref. 23, pp. 1 through 46].

During the subsurface investigations with direct-push technology, Region 2 SAT drilled through 17 to 73 feet of clay, silty clay, silt, and weathered bedrock minerals before encountering equipment refusal [Ref. 17, pp. 5 through 114]. Compact material and an increase in weathered bedrock minerals in the deeper intervals might be an indication of approaching the bedrock surface [Ref. 17, pp. 5 through 114]. Region 2 SAT's field investigation results correspond with existing data, which indicate that 9 to 120 feet of clay and 10 to 30 feet of decomposed rock overlie the volcanic bedrock throughout the municipality of Cidra. Hazardous substances have been found in wells located in the Pre-Robles Volcanic Sequence. The presence of contamination indicated that the clay layers do not act as an aquitard [Ref. 17, pp. 5 through 114; Ref. 23, pp. 1 through 46, 59, 64; Ref. 24, pp. 1, 13; Ref. 26, pp. 1, 3, 11].

Based on well logs, water-bearing zones in the bedrock range from 40 to 360 feet below ground surface (1041 to 1373 feet AMSL) in a confined aquifer. Region 2 SAT encountered ground water at a depth of 47 to 50 feet in one borehole, where equipment refusal was reached. Ground water flows toward and discharges to Cidra Lake (Ref. 3, p. 1; Ref. 9, pp. 5, 13, 16, 27 through 29, 31; Ref. 23, pp. 2, 3, 5, 12, 15, 27, 80; Ref. 110, p. 1).

The two strata encountered at the site: the silt, clay and decomposed rock overlying the Pre-Robles Volcanic Rock, both are described below:

Stratum 1 (shallowest)

Stratum Name: Upper Stratigraphic Unit

Description: The upper stratigraphic unit consists of 17-73 feet of reddish brown silty clay grading to gray and brown silty clay overlying weathered bedrock [Ref. 17, pp. 38 through 114]. The clay, silt, and decomposed rock is underlain by the Pre-Robles Volcanic Rock [Ref. 17, pp. 30 through 114; Ref. 23, p. 49]. In the Cidra area, the contact between the upper and lower stratigraphic unit is approximately 50 feet below ground surface [Ref. 17, pp. 38 through 114].

Stratum 2

Stratum Name: Pre-Robles Volcanic Rock (Lower Stratigraphic Unit)

Description: The lithology of the Pre-Robles Volcanic Rock is sparsely fossiliferous and variable, consisting of massive and thick bedded andesite and dacite submarine pyroclastic breccias with intercalated lavas, tuffs and limestone [Ref. 23, pp. 49 and 59]. Well data and logs obtained from PRASA, U.S. Geological Survey (USGS), and well owners/operators indicate that active and inactive wells are finished in the rock formation, described in the well logs mainly as blue, brown, or black volcanic rock [Ref. 23, pp. 1 through 46].

3.1 LIKELIHOOD OF RELEASE

3.1.1 Observed Release

Aquifer Being Evaluated: Pre-Robles Volcanic Rock

Multiple observed releases have been documented for the Cidra Ground Water Contamination site. Chemical analyses of four-closed public supply wells and two industrial process wells located in Cidra document observed releases as described below. [Ref. 10, pp. 8, through 10; Ref. 12, pp. 61, 65, 73, 74, 76, 77, 79, 80, 86, 131, 132, 134, 135, 137, 138, 140, 141, 152, 153; Ref. 13, pp. 5, 6, 8]. The chlorinated solvents found in the closed wells are not naturally occurring, and the non-detect concentrations in the background wells show that they are not ubiquitous in the area [Ref. 11, pp. 52, 53, 88, 89, 143, 144, 146, 147]. ESI-level sampling has been performed at facilities in and around Cidra which were suspected of using chlorinated solvents similar to those found in the closed public supply wells in Cidra. Based on these sampling results, no contamination can be traced through the intervening soil layer from any of the possible sources from the soil surface to the ground water.

In June 2002, EPA Region 2 SAT collected ground water samples from the closed wells and 20 other active and inactive wells in Cidra [Ref. 8, pp. 2, 3, 4, 6 through 10, 14, 17; Ref. 10, pp. 3 through 10]. PCE was detected in the four closed wells and two nearby industrial wells at concentrations ranging from 0.64 ug/L to 12 ug/L [Ref. 11, pp. 52, 53, 58, 59, 64, 65, 73 through 80, 85, 86, 88, 89, 131 through 147, 152, 153]. 1,1-DCE and cis-1,2-DCE, were also detected above SQLs in some of the same closed wells and industrial wells [Ref. 11, pp. 52, 53, 58, 59, 64, 65, 73 through 80, 85, 86, 88, 89, 131 through 147, 152, 153]. Chlorinated solvents were not detected at or above the SQL of 0.5 ug/L in any of four background wells (two inactive public wells, Zapera 1 and Zapera 2, and two active drinking water wells, Villa del Carmen and Pelegrin Santos, are evaluated as background due to similar depths and screened intervals to those of the wells where observed releases occurred) [Ref. 11, pp. 52, 53, 58, 59, 64, 65, 73 through 80, 85, 86, 88, 89, 131 through 147, 152, 153; Ref. 23, pp. 2, 3, 5, 7, 12, 15, 21 through 27, 29, 30, 44, 80, 83, 85, 88]. In what appears to be unrelated ground water contamination, PCE and other VOCs were detected in industrial/potable supply wells located about 3 to 3.5 miles northeast of the site [Ref. 11, pp. 52, 53, 58, 59, 64, 65, 73 through 80, 85, 86, 88, 89, 131 through 147, 152, 153].

In January and February 2003, Region 2 SAT continued the ESI by investigating 12 industrial sites in Cidra as potential sources of contamination to the ground water plume using field screening technology and confirmatory analyses through the Contract Laboratory Program (CLP) [Ref. 9, pp. 63 through 109]. Soil borings were completed at the 12 industrial sites plus two background sites, soil cores were retrieved at 5-foot intervals, and the cores were screened for the presence of chlorinated VOCs [Ref. 9, pp. 63 through 109; Ref. 17, all pages; Ref. 18, all pages; Ref. 19 p. 1]. The field-screening results indicated the presence of PCE, TCE, and trans-1,2-dichloroethylene (trans-1,2-DCE) in soils collected from the International Dry Cleaners site [Ref. 18, pp. 26, 27, 33]. CLP analytical results confirm that PCE and related substances are present in shallow soil at the site, at concentrations as high as 11,000 micrograms per kilogram (ug/kg) [Ref. 20, p. 15; Ref. 21, pp. 345, 346, 354, 355, 360, 361]. The only other significant concentrations were 1,1-DCE above the generic SSL in a deep soil sample from the Zenith Laboratories site [Ref. 20, pp. 13, 16; Ref. 21 p. 93; Ref. 22, p. 12].

All background and contaminated samples documenting these releases were collected from the aquifer of concern (i.e., Pre-Robles Volcanic Rock), which is estimated to have a thickness of 40 - 360 feet (1041 - 1372 ft AMSL) in the vicinity of the site [Ref. 23, p. 1; Ref. 110, p. 1].

Chemical Analysis**Cidra Area Wells****Background Concentrations (Public Supply Well)**

<u>Sample ID</u>	<u>Well Location</u>	<u>Depth (ft AMSL)*</u>	<u>Date**</u>	<u>Reference(s)</u>
1047-GW09 (B0J40)	Villa del Carmen	1093	6/10/02	9, p. 5; 23, p. 2
1047-GW10 (B0J41)	Zapera I	1326	6/17/02	9, p. 31; 23, p. 5
1047-GW11 (B0J42)	Zapera II	1041	6/17/02	9, p. 31; 23, p. 12
1047-GW27 (B0J58)	Pelegrin Santos	1373	6/12/02	9, p. 13; 23, p. 2

* - feet above mean sea level based on well records and data recorded and corrected using a GPS and associated software [Ref. 110, p. 1]

** - date sampled

<u>Sample ID</u>	<u>Hazardous Substance</u>	<u>Conc. (ug/L)</u>	<u>SQL (ug/L)***</u>	<u>Reference(s)</u>
1047-GW09	PCE	ND	0.50	11, pp. 52, 53
	1,1 DCE	ND	0.50	
	1,1, DCA	ND	0.50	
	cis-1,2-DCE	ND	0.50	
1047-GW10	PCE	ND	0.50	11, pp. 143, 144
	1,1 DCE	ND	0.50	
	1,1, DCA	ND	0.50	
	cis-1,2-DCE	ND	0.50	
1047-GW11	PCE	ND	0.50	11, pp. 146, 147
	1,1 DCE	ND	0.50	
	1,1, DCA	ND	0.50	
	cis-1,2-DCE	ND	0.50	
1047-GW27	PCE	ND	0.50	11, pp. 88, 89
	1,1 DCE	ND	0.50	
	1,1, DCA	ND	0.50	
	cis-1,2-DCE	ND	0.50	

*** - Ref. 112, pp. 126 through 134

ug/L - micrograms per liter

SQL - Sample Quantitation Limit

ND - contaminant not detected

Contaminated Samples (Closed Public Supply Wells)

<u>Sample ID</u>	<u>Well Location</u>	<u>Depth (ft AMSL)*</u>	<u>Date***</u>	<u>Reference(s)</u>
1047-GW03 (B0J34)	Cidra 3	1258	6/17/02	9, p. 29; 23, p. 27
1047-GW05 (B0J36)	Cidra 6	1183	6/14/02	9, p. 27; 23, pp. 3, 15
1047-GW06** (B0J37)	Cidra 6	1183	6/14/02	9, p. 27; 23, pp. 3, 15
1047-GW08 (B0J39)	Cidra 4	1253****	6/14/02	9, p. 28; 23
1047-GW20 (B0J51)	IVAX I	1103	6/12/02	9, p. 16; 23, p. 80
1047-GW21 (B0J52)	IVAX II	1103	6/12/02	9, p. 16; 23, p. 80
1047-GW22** (B0J53)	IVAX II	1103	6/12/02	9, p. 16; 23, p. 80

* - feet above mean sea level based on well records and data recorded and corrected using a GPS and associated software [Ref. 110, p. 1]

** - sample 1047-GW06 was a duplicate of sample 1047-GW05 and sample 1047-GW22 was a duplicate of sample 1047-GW21 [Ref. 9, pp. 16, 33].

*** - date sampled

**** - The well log consulted at the time of sample collection did not have a record of the depth of the well; however, the depth of this well could be estimated to be at least 125 feet in depth from the ground surface [Ref. 9, p. 27; Ref. 114, p. 1]

<u>Sample ID</u>	<u>Hazardous Substance</u>	<u>Conc. (ug/L)</u>	<u>SQL (ug/L)*****</u>	<u>Reference(s)</u>
1047-GW03	PCE	10	0.50	11, pp. 131, 132
	cis-1,2-DCE	1.0	0.50	
1047-GW05	PCE	0.64	0.50	11, pp. 134, 135
1047-GW06	PCE	0.72	0.50	11, pp. 137, 138
1047-GW08	PCE	0.74	0.50	11, pp. 140, 141
1047-GW20	PCE	3.5	0.50	11, pp. 8, 73, 74
	1,1-DCE	8.4 J (3.57)	0.50	
	1,1-DCA	0.51	0.50	
1047-GW21	PCE	3.6	0.50	11, pp. 8, 76, 77
	1,1-DCE	7.6 J (3.23)	0.50	
	1,1-DCA	0.62	0.50	
1047-GW22	PCE	4.1	0.50	11, pp. 8, 79, 80
	1,1-DCE	12 J (5.11)	0.50	
	1,1-DCA	0.70	0.50	

***** - Ref. 112, pp. 126 through 134

J - Estimated value

() - Adjusted concentration [Ref. 113, p. 8]

Attribution:

EPA performed an ESI to attempt to locate the source(s) of the contamination in January and February 2003. Twelve possible sources (including dry cleaners, laundries, a casket manufacturer, and pharmaceutical facilities) of the contaminants were identified, and soil boring sampling was performed at each possible source [Ref. 9, pp. 63 through 109; Ref. 26, p. 4].

Two to four sets of soil boring samples per possible source were collected, as well as two borings to represent background. The borings ranged in depth from 4 to 72 feet [Ref. 9, pp. 63 through 109]. Samples taken approximately every 5 feet were screened using a Field GC. Positive screen hits and a pre-established number of samples were also sent to a CLP laboratory for volatile organic analysis [Ref. 18, all pages].

In summary, no surface source of the ground water contaminants could be identified, however there are 5 possible sources associated with Source 1 and they are listed in the Other Possible Sources section of this report. The following are brief descriptions of the sources which are not potential sources associated with Source 1:

1. Cidra Metallic Caskets (CMT) CERCLIS No. PRN000204335

The CMT site is located at Road 172 kilometer 7.9 in the Certenejas Ward of Cidra, about 3.4 miles northeast of the ground water plume [Ref. 16, p. 7; Ref. 26, p. 4]. CMT has fabricated and finished metal caskets at the site since 1970, currently making 150 to 175 caskets per week [Ref. 56, p. 4; Ref. 57, p. 2]. The finishes and thinner used on site contain toluene, methyl ethyl ketone (MEK), and other chemicals, but they do not use chlorinated solvents such as TCE or PCE [Ref. 57, pp. 2, 14 through 57]. CMT has used the same thinner since it began operation; the company added Orange degreaser to enhance the cleaning process in approximately 1992 [Ref. 56, p. 4]. Wastes generated on site include dried paint waste, which is picked up for nonhazardous off-site disposal, and used paint thinner, which is either picked up and reused by a local contractor or placed in drums and allowed to evaporate [Ref. 10, p. 105; Ref. 56, p. 3; Ref. 57, p. 3]. CMT does not produce or receive manifests or other waste disposal documents. Rags soaked with thinner and degreaser are discarded with regular trash [Ref. 56, p. 3; Ref. 57, pp. 3, 4].

CMT operates under an EQB air permit for its stacks and generator [Ref. 56, p. 7; Ref. 57, pp. 4, 59 through 87]. The company has had previous violations of its air permits, including objectionable odors in the neighboring residential areas [Ref. 58, pp. 1 through 7]. EQB approved a modification to increase paint and generator usage in December 2000 [Ref. 56, p. 7; Ref. 57, p. 59]. During inspections in June 2000 and April 2002, EPA observed paint and chemical odors at the site. EPA also noticed wastewater discharging through floors directly to soil, drums scattered about the premises, and stressed vegetation [Ref. 34, p. 7; Ref. 56, pp. 3 through 7]. Some of the drums contained liquid, and EPA observed the presence of rust, dents, and bulges on some drums [Ref. 57, p. 3].

CMT was listed in the April 1992, February 2000, and current Puerto Rico directories of manufacturers; however, it was not listed in the April 1983 directory [Ref. 45, p. 21; Ref. 46, p. 3; Ref. 51, pp. 32, 33; Ref. 56, p. 25]. The firm was not included in EPA's RCRA facility list for Cidra [Ref. 47, pp. 4, 5], nor was it included in the lists of Cidra companies that submitted Tier 1 and 2 Reports to EPA in 1993, 1997, or 1998 [Ref. 40, p. 3; Ref. 41, p. 6; Ref. 64, pp. 7, 8]. Additionally, CMT does not have a UIC permit, and was not identified as a significant violator by the PRASA Pretreatment Program from 1990 through 1998 [Ref. 42, p. 1; Ref. 59, p. 3].

One surface and two subsurface soil samples were collected from two soil borings at the CMT site as part of the ESI [Ref. 9, pp. 105 through 110; Ref. 20, p. 16]. There were no concentrations detected above background in any of the samples collected from this site which can be related to the contamination found in the wells outlined in Source 1 [Ref. 21, pp. 433 through 341]. Additionally, this site is located on the eastern side of the Lago de Cidra which might serve as a groundwater divide from the contamination identified in Source 1 [Ref. 26, p. 4, 10].

2. CMM Laundry (CMM) CERCLIS No. PRN000204330

The CMM site is located on Road 172 in Barrio Cañaboncito, Caguas, just beyond the Cidra border and about 3.9 miles northeast of the ground water plume [Ref. 16, p. 9; Ref. 26, p. 4; Ref. 59, p. 1]. The dry-cleaning business has

operated at this location since approximately 1983, as Advance Laundry Co., CMM, and currently under the same management as Country Dry Cleaners, Inc. [Ref. 34, p. 5; Ref. 59, p. 1]. PCE is stored and used at the site [Ref. 17, pp. 31, 163; Ref. 34, p. 5]. The business operator leases the building space from the property owner. The laundry discharged wastewater to a cesspool behind the building at a lower elevation until early to mid-2001, when the property owner installed a new cesspool and required the dry cleaner to install a wastewater collection tank. Laundry wastewater flows to the aboveground steel tank, which is situated behind the building at a lower elevation, via a PVC pipe that is suspended precariously over the ground. A waste hauler removes the tank contents on an as-needed basis [Ref. 9, pp. 92, 93; Ref. 17, pp. 30, 160 through 163; Ref. 59, p. 1].

One surface and two subsurface soil samples were collected from two soil borings at the CMM site as part of the ESI [Ref. 9, pp. 92, 98 through 100; Ref. 20, p. 15]. There were no concentrations detected above background in any of the samples collected from this site which can be related to the contamination found in the wells outlined in Source 1 [Ref. 18, 342 through 344 and 432 through 440]. Additionally, this site is located on the eastern side of the Lago de Cidra which might serve as a groundwater divide from the contamination identified in Source 1 [Ref. 26, p. 4, 10].

3. Creative Medical Corp. (CRE)

CERCLIS No. PRN000204336

The CRE site is located at Road 172 kilometer 9.4, about 2.5 miles northeast of the ground water plume [Ref. 16, p. 11; Ref. 26, p. 4]. Loprey Rattan, Inc. (a.k.a. Rattan Specialties of Puerto Rico) manufactured rattan furniture and cushions at the building from the 1970s until July 1984 [Ref. 60, pp. 4, 5; Ref. 61, pp. 2, 20]. Knogo Caribe, Inc., a manufacturer of electronic surveillance devices, bought the property in August 1984 and operated until 1998 [Ref. 60, p. 5; Ref. 61, pp. 1, 2, 21; Ref. 62, p. 2]. CRE, the building owner since February 1999, manufactures over-the-counter medicines such as cough syrup [Ref. 9, p. 67; Ref. 34, p. 8; Ref. 60, p. 2; Ref. 63, p. 3].

When Loprey and Knogo occupied the facility, process and sanitary wastewater was treated in an on-site wastewater treatment plant. The effluent was discharged through sprinklers to irrigate a grassy area in the rear portion of the property [17, p. 8; Ref. 34, pp. 8, 88; Ref. 60, pp. 5, 7; Ref. 62, p. 2]. Knogo operated under UIC permit 84-0312 [Ref. 51, p. 3; Ref. 60, p. 1; Ref. 62, p. 2], and was not identified as a significant violator by the PRASA Pretreatment Program from 1990 through 1998 [Ref. 33, p. 1]. The liquids used by Knogo included solvents containing methanol, trichlorotrifluoroethane, isopropanol, and toluene. The company also used lead solder to make its circuit boards [Ref. 64, pp. 6, 7]. In June 2000, EPA reported that Knogo used a licensed contractor for off-site disposal of hazardous wastes [Ref. 34, p. 8].

Since beginning its operation in 1999, CRE has not treated wastewater on site [Ref. 34, p. 8; Ref. 62, p. 1; Ref. 65, p. 1]. Wastewater generated by the company is collected in a tank for off-site disposal by a licensed contractor [Ref. 9, p. 67; Ref. 17, p. 8; Ref. 34, p. 8]. Wastes that were manifested for off-site disposal, with CRE listed as a small quantity generator, have included waste flammable liquids NOS, ammonia solutions, hypochlorite solutions, corrosive liquids, and non-regulated liquids [Ref. 66, pp. 1 through 10]. Sanitary wastes from the septic tank are removed separately [Ref. 67, pp. 1 through 30]. In August 2001, EQB reported that CRE does not generate hazardous wastes [Ref. 68, p. 3]. However, CRE submitted a Notification of Hazardous Waste Activity to EPA in September 2001 and is currently included in EPA's RCRA list for Cidra under facility ID 000012573904 [Ref. 38, p. 7; Ref. 63, pp. 1, 2, 3].

The former occupants of the CRE site, Loprey and Knogo, were listed in the April 1983 and April 1992 Puerto Rico directories of manufacturers, respectively [Ref. 42, p. 15; Ref. 47, p. 20]. Knogo was not included in the lists of Cidra companies that submitted Tier 1 and 2 Reports to EPA in 1993, 1997, or 1998 [Ref. 31, p. 3; Ref. 32, p. 6; Ref. 55, pp. 7, 8]. CRE was not listed in the February 2000 or current directories of manufacturers [Ref. 36, p. 23; Ref. 37, pp. 2 through 6].

One surface and three subsurface soil samples (including a duplicate) were collected from two soil borings at the CRE site as part of the ESI [Ref. 9, pp. 67 through 70, 77; Ref. 20, p. 12]. There were no concentrations detected above background in any of the samples collected from this site which can be related to the contamination found in the wells outlined in Source 1 [Ref. 21, pp. 60 through 71]. Additionally, this site is located on the eastern side of the Lago de Cidra which might serve as a groundwater divide from the contamination identified in Source 1 [Ref. 26, p. 4, 10].

The EXC site is located on Road 172, about 0.3 mile northeast of Cidra Well 4 [Ref. 16, p. 13; Ref. 26, p. 4]. EXC has operated in Cidra since about 1970, first in the village and at the current location since approximately 1988. The business operator has always used a petroleum distillate, Exxol D40, as the dry-cleaning solvent, and has never used PCE [Ref. 34, p. 10; Ref. 69, pp. 1, 2]. The business used a septic tank in the rear of the facility until recently being hooked up to the public sewer system [Ref. 69, p. 1].

EQB performed an inspection of EXC in May 1994, and reported that the facility did not have the required UIC permit for its septic tank or an SPCC Plan for a 500-gallon diesel tank observed on site [Ref. 70, p. 1]. EQB re-inspected the facility in May 1995 [Ref. 71, p. 1]. During both inspections, EQB reported that laundry wash waters were gaining access to the floor of the facility, and to the nearby Lago de Cidra via storm water channels [Ref. 70, pp. 4, 5; Ref. 71, pp. 1, 2, 3].

EXC was not listed in the April 1983, April 1992, February 2000, or current Puerto Rico directories of manufacturers [Ref. 36, p. 23; Ref. 37, pp. 2 through 6; Ref. 42, p. 32; Ref. 47, p. 26]. The company is not included in EPA's RCRA facility list for Cidra [Ref. 38, pp. 11, 12], nor was it included in the lists of Cidra companies that submitted Tier 1 and 2 Reports to EPA in 1993, 1997, or 1998 [Ref. 31, p. 3; Ref. 32, p. 6; Ref. 55, pp. 7, 8]. EXC does not have a UIC permit, and was not identified as a significant violator by the PRASA Pretreatment Program from 1990 through 1998 [Ref. 33, p. 1; Ref. 50, p. 3].

Three surface (including a duplicate) and one subsurface soil samples were collected from two soil borings at the EXC site as part of the ESI [Ref. 9, pp. 96, 97; Ref. 20, p. 15]. There were no concentrations detected above background in any of the samples collected from this site which can be related to the contamination found in the wells outlined in Source 1 [Ref. 21, pp. 441 through 450].

5. Shellfoam Products (SHE)

CERCLIS No. PRD987377264

This PRIDCO-owned site is located on A Street in Cidra Industrial Park, about 0.1 mile southeast of Cidra Well 8 [Ref. 16, p. 24; Ref. 26, p. 4; Ref. 34, pp. 4, 86; Ref. 39, p. 1]. PRIDCO constructed the building in 1968 and leased it to Bersford Shoe Company Inc. for shoe manufacturing from November 1968 until December 1969. The second occupant, Rosan Industries Inc., produced women's stockings at the facility from July 1970 through August 1971 [Ref. 81, p. 6]. The current occupant, SHE, has manufactured foam containers from expandable polystyrene at the site since February 1972 [Ref. 72, p. 6; Ref. 73, p. 7]. The site is currently on EPA's list of Archived Sites under EPA ID number PRD987377264 [Ref. 16, p. 24].

PRIDCO investigated the site in 1992. Soil samples collected from the lot adjacent to the SHE building in March 1992 indicated the presence of total petroleum hydrocarbons (TPH) at concentrations ranging from 108 to 393 milligrams per kilogram (mg/kg). PRIDCO reported that the results were indicative of environmental contamination [Ref. 72, pp. 7 through 16]. EQB completed a Preliminary Assessment (PA) of the SHE site in July 1992. The EQB inspectors observed that foam particles generated by the manufacturing process are sold to be reused for gardening, and cooling water is recycled through the machinery [Ref. 73, pp. 8, 9, 44]. EQB recommended no further action under Superfund because SHE does not generate hazardous wastes [Ref. 73, pp. 1, 14].

In July 1987, SHE closed in place a 10,000-gallon underground storage tank (UST) that had been used for storage of Combustible Bunker C petroleum fuel [Ref. 73, p. 7; Ref. 74, pp. 3, 4]. In July 1994, the company notified EQB about the past UST closure [Ref. 74, pp. 1 through 4]. SHE completed soil borings and collected soil samples in the tank vicinity in August 1995 and March 1996. The samples were analyzed for TPH, and the results ranged from non-detect to 152 mg/kg [Ref. 75, pp. 9, 16; Ref. 76, pp. 9, 16]. Based on the results, EQB required no further environmental investigation regarding the UST [Ref. 77, p. 2].

An EPA inspection in 2000 indicated that SHE periodically cleans its machinery with degreasing solvents. Poor materials handling and housekeeping practices were observed during the EPA inspection. The only dangerous substance observed on site by EPA was diesel fuel, which was stored in aboveground tank with secondary containment [Ref. 34, p. 13]. Similar observations were made by Region 2 SAT during the ESI/RI field activities in February 2003 [Ref. 9, p. 84; Ref. 17, pp. 20, 139 through 143].

SHE was listed in the April 1983, April 1992, February 2000, and current Puerto Rico directories of manufacturers [Ref. 36, p. 14; Ref. 37, p. 6; Ref. 42, p. 23; Ref. 47, p. 15]. SHE is not included in EPA's RCRA facility list for Cidra [Ref. 47, p. 20], nor was it included in the lists of Cidra companies that submitted Tier 1 and 2 Reports to EPA in 1993, 1997, or 1998 [Ref. 31, p. 3; Ref. 32, p. 6; Ref. 55, pp. 7, 8]. SHE does not have a UIC permit, and was not identified as a significant violator by the PRASA Pretreatment Program from 1990 through 1998 [Ref. 42, p. 1; Ref. 50, p. 3].

One surface and two subsurface soil samples were collected from two soil borings at the SHE site as part of the ESI [Ref. 9, pp. 84, 85, 93; Ref. 20, p. 13]. There were no concentrations detected above background in any of the samples collected from this site which can be related to the contamination found in the wells outlined in Source 1 [Ref. 21, 450 through 458].

6. SmithKline Beecham Pharmaceuticals Inc. (SKB) CERCLIS No. PRD090023250

The SKB site is located at Road 172 kilometer 9.1, about 2.7 miles northeast of the ground water plume [Ref. 16, p. 17; Ref. 26, p. 4]. SKB companies have manufactured pharmaceutical products at the plant since 1978 [Ref. 36, p. 12; Ref. 42, p. 18; Ref. 47, p. 11; Ref. 78, pp. 2, 9; Ref. 79, pp. 9, 17, 19, 20]. The site was listed in the April 1983 Puerto Rico directory of manufacturers as S.K.&F. Co. [Ref. 42, p. 18], and in the April 1992, February 2000, and current directories as SmithKline Beecham Pharmaceuticals Co. [Ref. 36, p. 12; Ref. 37, p. 4; Ref. 47, p. 11]. The current operating name is SB Pharmco Puerto Rico, Inc. [Ref. 78, p. 1; Ref. 81, p. 1].

The manufacturing process at the SKB plant does not generate hazardous wastes; however, the facility operates under a RCRA Part A Permit due to hazardous waste generation in its three on-site laboratories and from expired reagents [Ref. 38, p. 19; Ref. 78, pp. 2, 3]. The company uses or has used PCE, TCE, methylene chloride, chlorobenzene, and other materials in its laboratories and generates those substances as hazardous wastes [Ref. 78, pp. 2, 3, 4, 11, 12, 13; Ref. 82, pp. 1, 2].

The SKB plant is listed as S K & F Co. in EPA's RCRA list under facility ID PRD090023250 [Ref. 38, p. 19]. EQB performed a full RCRA Generator and TSF Inspection at the SKB facility on October 9, 1992. As a result of the inspection, EQB found that the company was not in full compliance with RCRA standards [Ref. 78, pp. 1, 5]. The facility submitted Tier 1 and 2 Reports to EPA in 1993 and 1997; however, it did not submit Tier 1 and 2 Reports in 1998. Methylene chloride, chloroform, and other substances were reported as wastes generated in 1997 [Ref. 31, p. 3; Ref. 32, p. 6; Ref. 55, p. 8].

SB Pharmco discharged treated process wastewater to an unnamed stream under National Pollutant Discharge Elimination System (NPDES) Permit PR0021997 until March 2001 [Ref. 80, p. 11; Ref. 83, pp. 1, 4; Ref. 84, pp. 1, 3]. EQB or EPA performed compliance evaluation inspections with respect to the NPDES permit in February 1990, November 1993, June 1999, June 2000, and June 2001 [Ref. 84, p. 1; Ref. 85, p. 3; Ref. 86, p. 1; Ref. 87, p. 1; Ref. 88, p. 1]. In March 2000, EPA issued SB Pharmco an Administrative Order for violations with respect to the NPDES permit [Ref. 89, pp. 1 through 4]. Since March 2001, SB Pharmco discharges treated process wastewater to the sewer system under Pretreatment Permit GDA-01-505-044 [Ref. 84, p. 3]. SmithKline was not identified as a significant violator by the PRASA Pretreatment Program from 1990 through 1998 [Ref. 33, p. 1].

SB Pharmco is authorized to discharge industrial storm water runoff to the unnamed stream under NPDES Multi-Sector General Permit PRR05A784 [Ref. 84, pp. 1, 3]. A septic tank at the facility is regulated under UIC Permit 84-21-0288 [Ref. 50, p. 3; Ref. 90, p. 1; Ref. 91, p. 1]. EPA performed a Multimedia Inspection of the site with respect to water programs in May 2000. In addition to reporting on the aforementioned discharge permits, EPA reported that the company has its own water supply in the form of two on-site wells [Ref. 80, pp. 1, 12, 13, 20 through 31]. SKB maintains Air Permit PFE-21-0996-1021-I-II-III-O for emissions of VOCs and other parameters [Ref. 92, pp. 1, 4, 11; Ref. 193, pp. 1, 2; Ref. 94, pp. 1 through 16]. As a result of a September 1999 inspection, EQB issued SKB a Notice of Violation regarding the air permit [Ref. 95, p. 1; Ref. 96, pp. 1, 2].

One surface and four subsurface soil samples were collected from four soil borings at the SKB site as part of the ESI [Ref. 9, pp. 71 through 76; Ref. 20, pp. 12, 13]. There were no concentrations detected above background in any of the samples collected from this site which are attributable to the contamination found in the wells outlined in Source 1 [Ref. 21, pp. 72 through 77 and 99 through 104]. Additionally, this site is located on the eastern side of the Lago

de Cidra which might serve as a groundwater divide from the contamination identified in Source 1 [Ref. 26, p. 4, 10].

7. Tech Group de Puerto Rico, Inc. (TGP)

CERCLIS No. PRN0002043486

The TGP site is located at Route 1 kilometer 48.7, about 4.4 miles east of the ground water plume [Ref. 17, p. 19; Ref. 26, p. 4]. The original occupant, Bourns Puerto Rico Inc., manufactured electrical potentiometers at the plant until 1987 [Ref. 9, p. 63; Ref. 97, p. 3]. The current occupant, TGP, has manufactured injection-molded plastic parts for the medical and electronics industries at the plant since 1989 [Ref. 9, pp. 63, 65; Ref. 34, p. 14; Ref. 98, p. 2].

Bourns PR, Inc. was classified as a RCRA large quantity generator (LQG) under Facility ID PRD090057878, and is still included in EPA's RCRA list for Cidra [Ref. 47, pp. 1, 2; Ref. 99, p. 1]. Hazardous wastes generated by Bourns PR included 1,1,1-trichloroethane (1,1,1-TCA) and MEK [Ref. 100, pp. 2, 4]. Bourns operated an on-site wastewater treatment plant, which included aeration of industrial wastewater and subsequent irrigation of the property with the effluent. In May 1984, EQB cited Bourns PR for violations of its effluent limits [Ref. 97, pp. 3, 4, 5]. Bourns subsequently agreed to upgrade its wastewater treatment system and meet a compliance schedule dictated by EQB [Ref. 110, pp. 2 through 5]. In 1988, Bourns PR performed closure of the treatment plant and shipped 25,000 gallons of nonhazardous sludge to a landfill for disposal [Ref. 102, pp. 1 through 6].

TGP uses the same on-site wastewater treatment plant as Bourns PR [Ref. 9, p. 63]. The company cleans its equipment with isopropyl alcohol on a daily basis, and with mineral spirits and acetone on a less frequent basis. Rags from the cleaning activities are discarded with domestic garbage [Ref. 98, p. 2]. The TGP facility operates electrical generators and maintains two diesel tanks under air permit PFE-LC-RG-21-0800-0033-I-II-O [Ref. 103, p. 1].

Bourns PR Inc. was listed in the April 1983 Puerto Rico directory of manufacturers [Ref. 42, p. 30]. Tech Group was listed in the April 1992 directory as Tech CBI Inc, and in the February 2000 and current directories as TGP [Ref. 36, p. 16; Ref. 37, p. 4; Ref. 47, p. 18]. TGP is not listed in EPA's RCRA facility list [Ref. 38, p. 20], nor was it included in the lists of Cidra companies that submitted Tier 1 and 2 Reports to EPA in 1993, 1997, or 1998 [Ref. 31, p. 3; Ref. 32, p. 6; Ref. 55, pp. 7, 8]. The facility does not have a UIC permit, and was not identified as a significant violator by the PRASA Pretreatment Program from 1990 through 1998 [Ref. 33, p. 1; Ref. 50, p. 3].

One surface and two subsurface soil samples and one ground water sample were collected from two soil borings at the TGP site as part of the ESI [Ref 9, pp. 63 through 66; Ref. 20, p. 12]. There were no concentrations detected above background in any of the samples collected from this site which can be related to the contamination found in the wells outlined in Source 1 [Ref. 21, pp. 78 through 86]. Additionally, this site is located on the eastern side of the Lago de Cidra which might serve as a groundwater divide from the contamination identified in Source 1 [Ref. 26, p. 4, 10].

Hazardous Substances Released:

PCE
cis-1,2-DCE
1,1-DCE
1,1-DCA

Ground Water Observed Release Factor Value: 550

3.2 WASTE CHARACTERISTICS

3.2.1 Toxicity/Mobility

<u>Hazardous Substance</u>	<u>Source Numbers</u>	<u>Toxicity Factor Value</u>	<u>Mobility Factor Value</u>	<u>Toxicity/Mobility</u>	<u>Reference(s)</u>
PCE	1	100	1.0	100	2, p. BI-10
cis 1,2-dichlorothene	1	100	1.0	100	2, p. BI-5
1,1-dichloroethene	1	100	1.0	100	2, p. BI-5
1,1-dichloroethane	1	10	1.0	10	2, p. BI-4

Toxicity/Mobility Factor Value: 100

3.2.2 Hazardous Waste Quantity

<u>Source Number</u>	<u>Source Hazardous Waste Quantity (HWQ) Value (Section 2.4.2.1.5)</u>	<u>Is source hazardous constituent quantity data complete? (yes/no)</u>
1	>0	No
<hr/>		
Sum of Values:	>0 (rounded to nearest integer as specified in HRS Section 2.4.2.2)	

The sum corresponds to a hazardous waste quantity factor value of 1 in Table 2-6 of the HRS [Ref. 1, p. 51591]. However, based on the fact that targets are subject to Level I concentrations (see Section 3.3.2.3 of this document), a hazardous waste quantity factor value of 100 can be assigned if it is greater than the hazardous waste quantity value from Table 2-6 (i.e., 1) [Ref. 1, p. 51592]. Therefore, a hazardous waste quantity factor value of 100 is assigned for the ground water pathway.

3.2.3 Waste Characteristics Factor Category Value

PCE corresponds to the toxicity/mobility factor value of 100, as shown previously (see Section 3.2.1).

$$\text{Toxicity/Mobility Factor Value (100) x Hazardous Waste Quantity Factor Value (100): } 1 \times 10^4$$

The product 1×10^4 corresponds to a Waste Characteristics Factor Category Value of 10 in Table 2-7 of the HRS [Ref. 1, p. 51592].

Hazardous Waste Quantity Factor Value: 100
 Waste Characteristics Factor Category Value: 10

3.3 TARGETS

Residents of Cidra obtained drinking water from three of the four closed public supply wells (Cidra 3, 4, and 6) until the wells were closed due to the PCE contamination associated with the Cidra Ground Water Plume site [Ref. 5, p. 1; Ref. 6, pp. 2, 3; Ref. 7, pp. 2, 3]. Analytical data for samples collected in June 2002 document that the wells remain actually contaminated by hazardous substances attributed to the observed release from the site. Therefore, the estimated populations served by those wells at the time of closure are assigned a level (I or II) of contamination based on the lab data, as follows:

Based on 1995 data, 1,240 people were served by ground water withdrawals in Cidra (the population number is considerably lower than the 5,569 people currently served by four active wells in the Cidra system, and so serves the purpose of providing conservative estimates) [Ref. 25, pp. 1, 6, 9, 18, 33, 42]. Withdrawal data for wells in the Cidra system show that no single well provided more than 40% of the total ground water supply from 1996 through 1999. Therefore, the ground water population (i.e., 1,240) is apportioned equally among the active wells in a given year [Ref. 25, pp. 1, 6, 9, 18, 33, 42]. There were seven active wells in 1996, eleven active wells in 1999, and six active wells in 2000. The apportioned populations and levels of contamination are presented below:

<u>Well</u>	<u>Distance from Source (mi.)</u>	<u>Population</u>	<u>Level I Contam. (Y/N)</u>	<u>Level II Contam. (Y/N)</u>	<u>Potential Contam. (Y/N)</u>	<u>Reference(s)</u>
Cidra 3	0.0 mile	113	Y	N	N	Ref. 25, pp. 1, 33
Cidra 4	0.0 mile	177	N	Y	N	Ref. 25, pp. 1, 7
Cidra 6	0.0 mile	207	N	Y	N	Ref. 25, pp. 1, 42

All wells are screened in the Pre-Robles Volcanic Sequence

Level I Samples

<u>Sample</u>	<u>Substance</u>	<u>Concentration</u>	<u>Benchmark</u>	<u>Reference</u>
1047-GW03 132	PCE	10 ug/L	1.6 ug/L	2, p. BII-11; Ref. 11, pp. 131, 132

3.3.2.4 Potential Contamination

The populations currently served by wells located within 4-miles of the site that draw from the aquifer of concern are:

<u>Distance Category</u>	<u>Potential Population</u>	<u>Distance-Weighted Population Value</u>
0 to ¼ mile	0	0
>¼ to ½ mile	2,263	1,013
>½ to 1 mile	2,811	523
>1 to 2 mile	1,866	294
>2 to 3 mile	1,898	212
>3 to 4 mile	0	0

Sum of Distance-Weighted Population Values: 2,042

Ref. 1, p. 51604; Ref. 23, p. 2; Ref. 26, p. 11; Ref. 27, p. 1

Based on the above information, the potential contamination factor value is 204.2. This value is obtained by multiplying the distance-weighted population sum value by 0.1 (2,042 x 0.1 = 204.2) [Ref. 1, p. 51604].

Potential Contamination Factor Value: 204.2

3.3.3 Resources

Available information indicates that ground water is used as a resource within the 4-mile radius of the site, specifically as an ingredient in commercial food preparation at the Carribean Refrescos, Inc. facility; therefore, a resources factor value of 5 is assigned [Ref. 1, p. 51604; Ref. 23, p. 89].

Resources Factor Value: 5

3.3.4 Wellhead Protection Area

The Wellhead Protection Program for Puerto Rico was developed in accordance with Section 1428 of the Safe Drinking Water Act and approved by EPA in 1991 [Ref. 28, pp. 3, 4; Ref. 111, p. 1]. Wellhead protection areas are defined by a fixed radius of 1,500 feet around each public supply well that does not withdraw water from the North Coast artesian limestone aquifer [Ref. 28, pp. 29 through 39]. The Cidra ground water contamination site is located in the Interior Province of Puerto Rico, outside of the North Coast artesian limestone aquifer, so the 1,500-foot fixed radius is applicable for the closed and active public supply wells within the target distance limit of the site [Ref. 28 p. 32]. Based on this information, observed ground water contamination associated with the site lies within a designated wellhead protection area (at the closed public supply wells), and a wellhead protection area factor value of 20 is assigned [Ref. 1, p. 51604].

Wellhead Protection Area Factor Value: 20